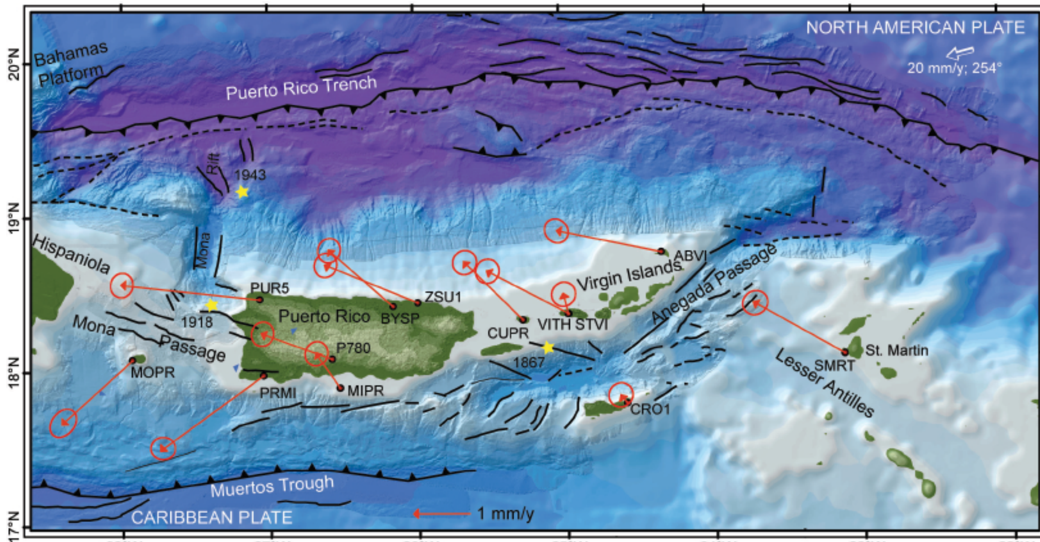
GPS vectors are unusual compared to other oblique subduction zones



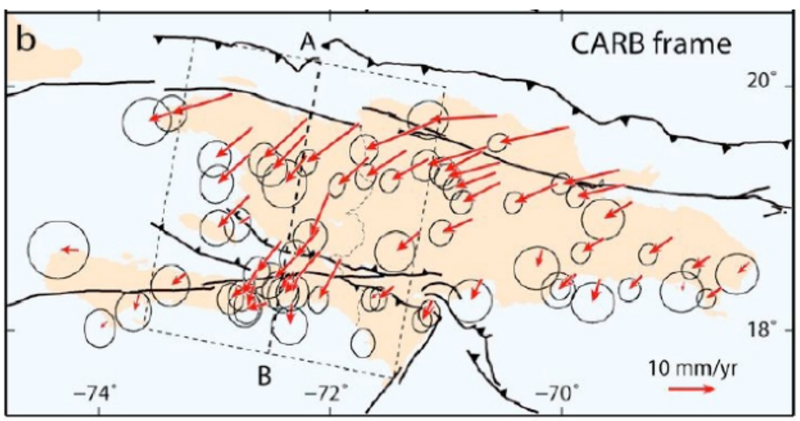
Continuously-measured GPS over 3-5 years

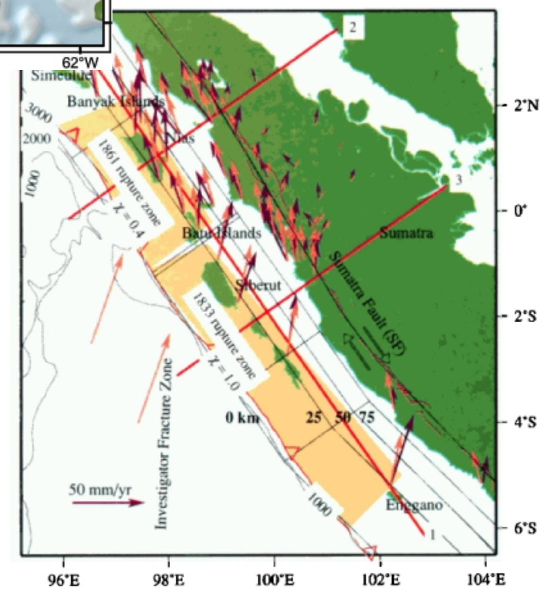
Observed

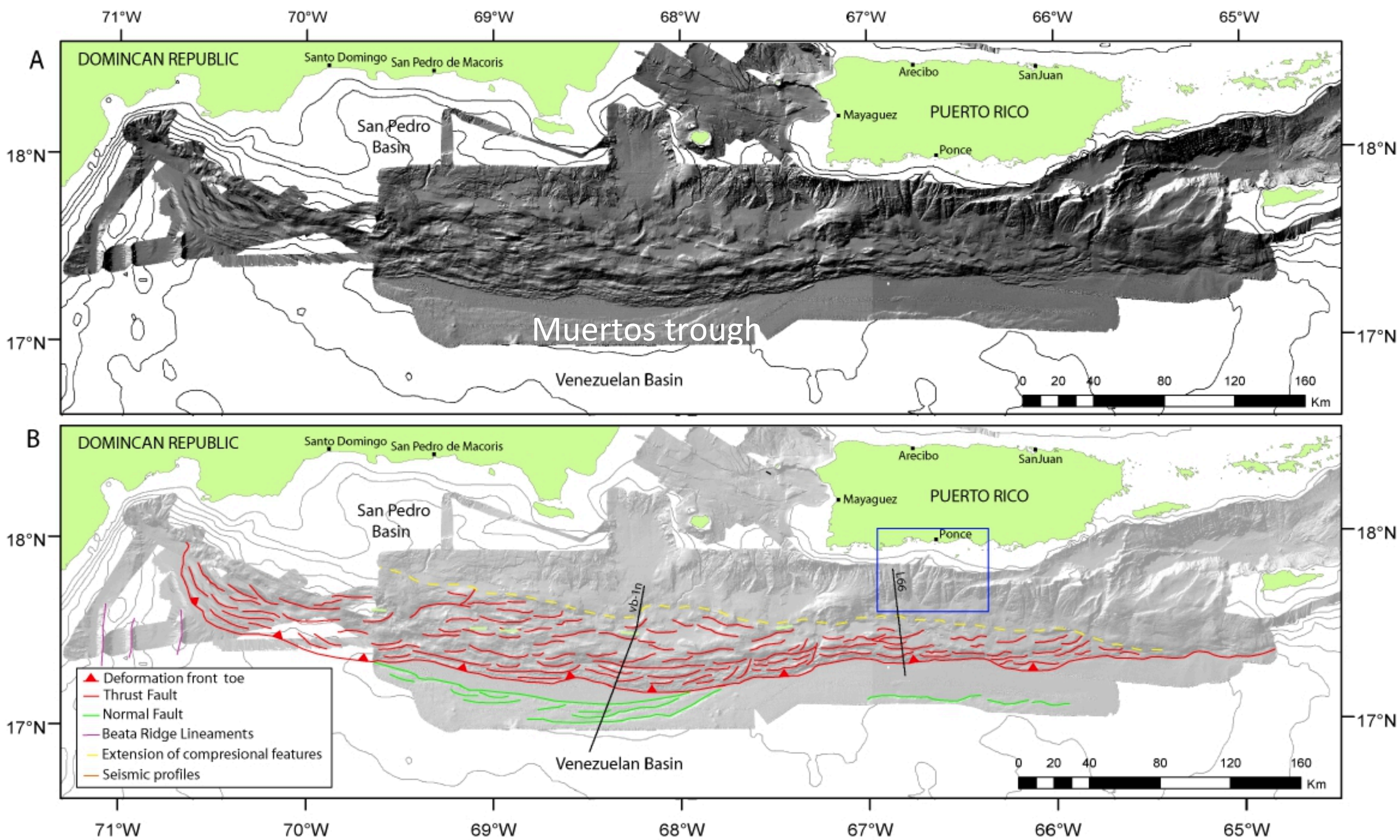
Error ellipse

Sumatra (Prawirodirjo et al., 1997)

Hispaniola (Calais et al., 2010)







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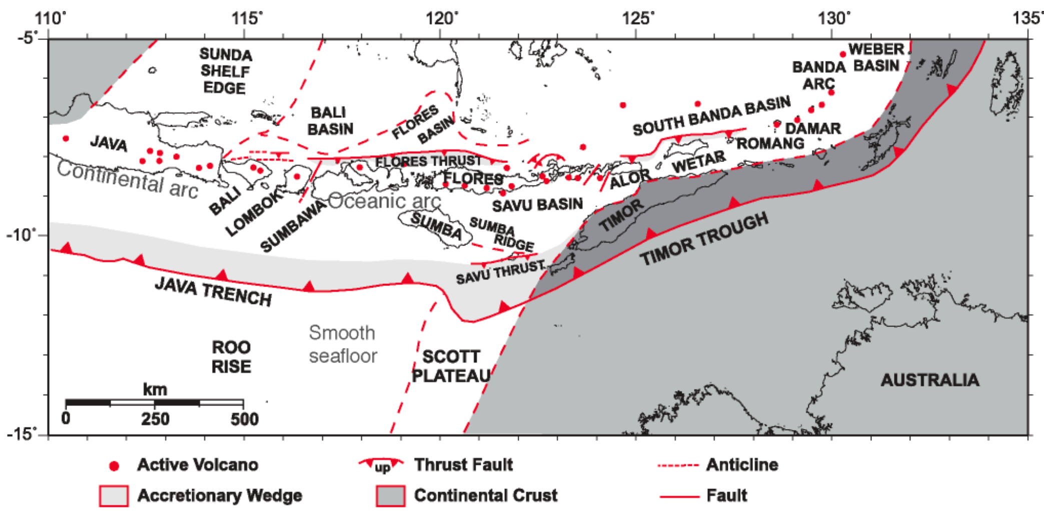
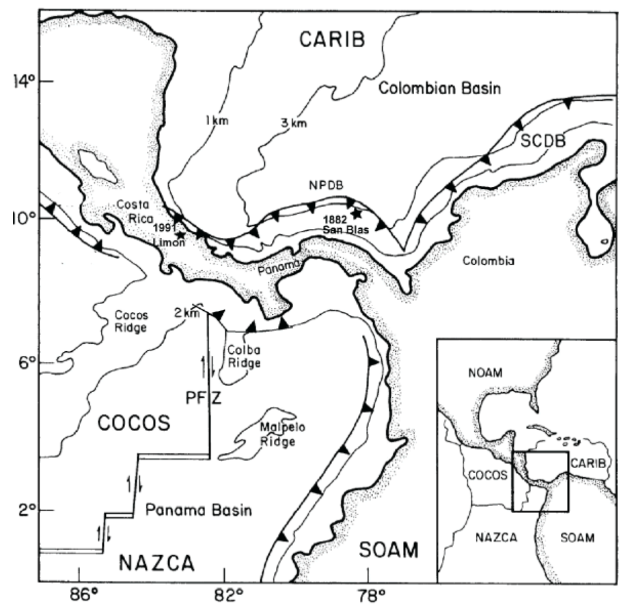
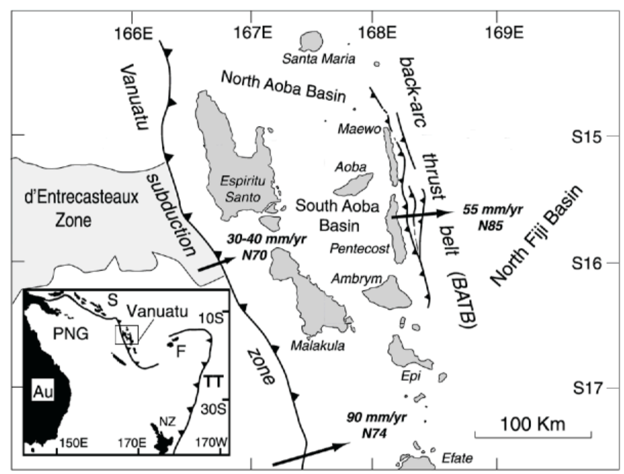
The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information.







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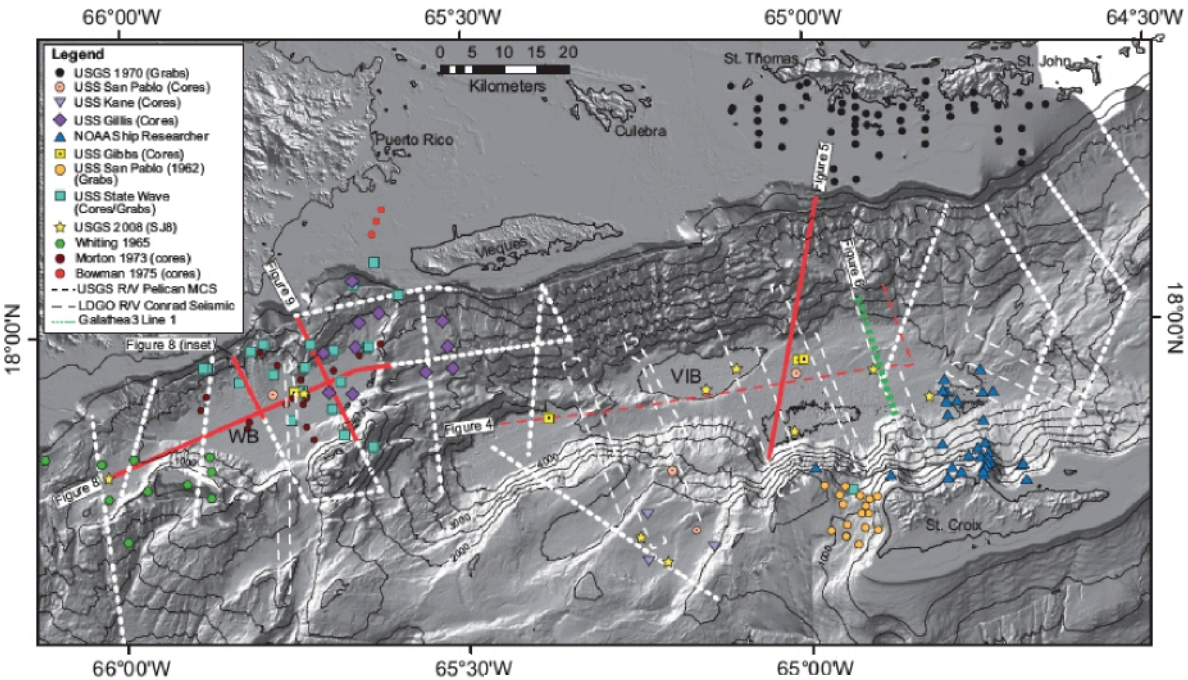
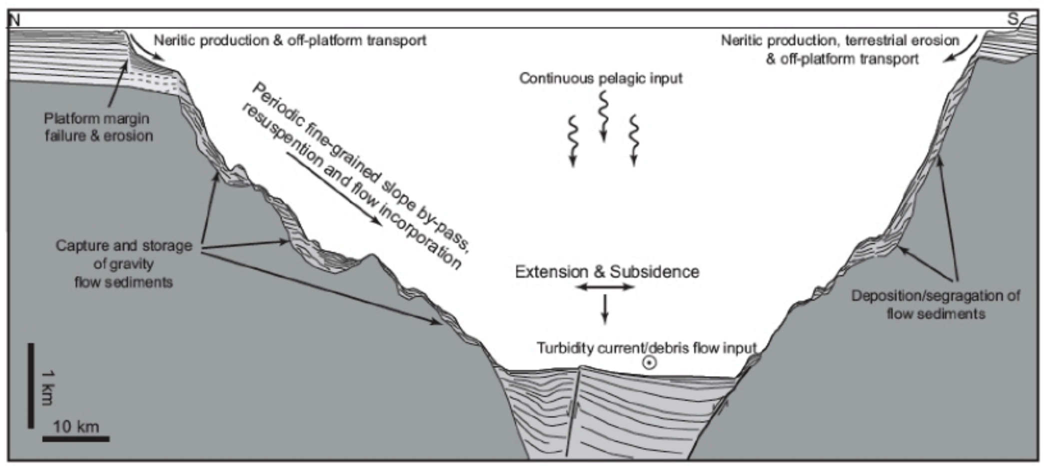
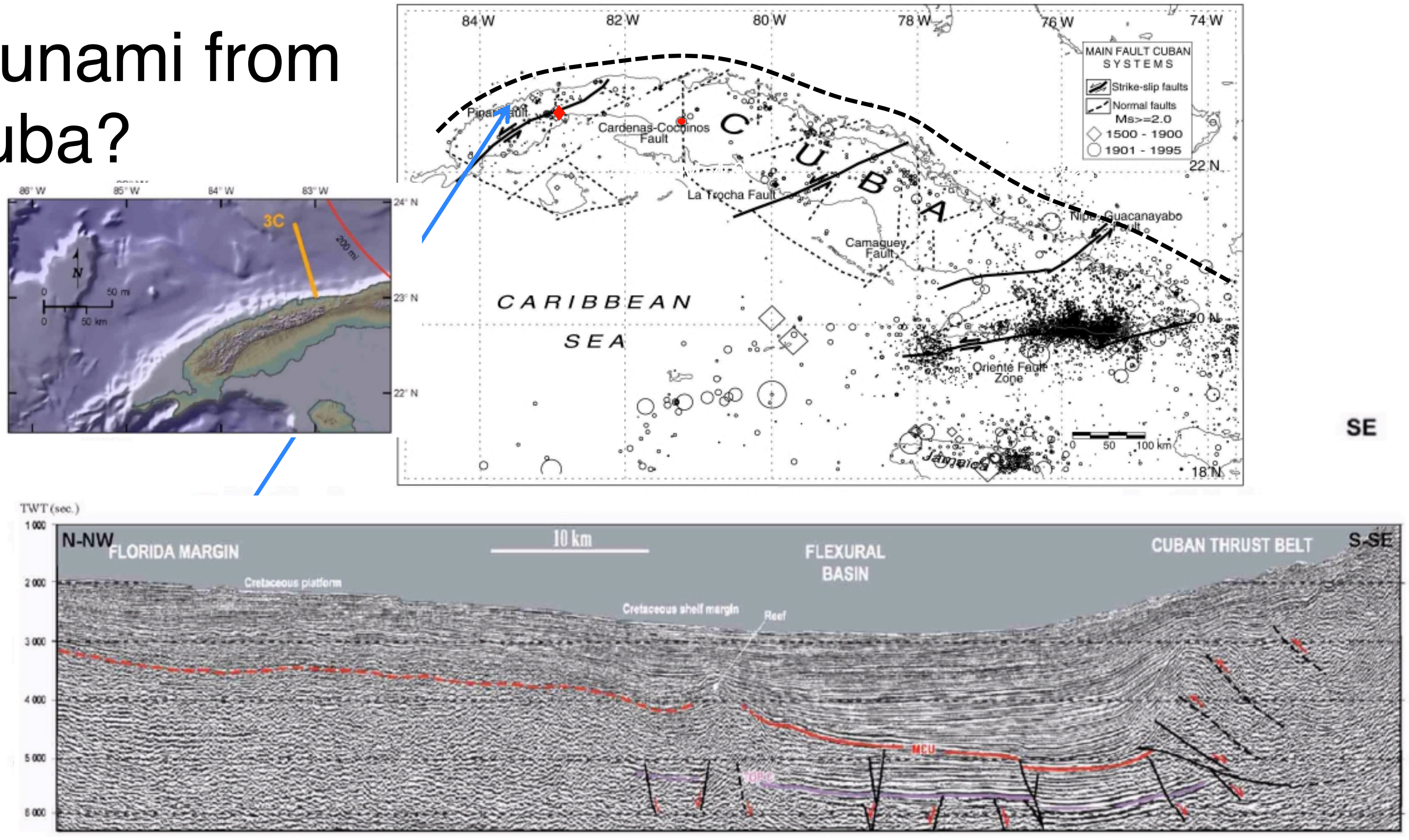


1867 Virgin Island M~7.2 earthquake and tsunami

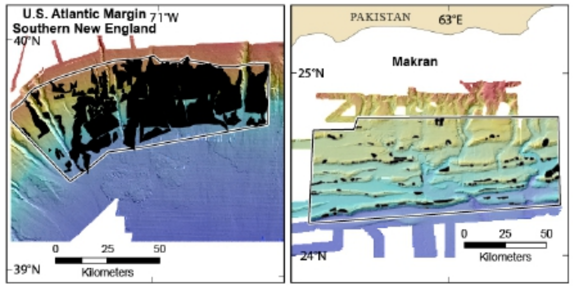


(From Chaytor and ten Brink, 2014)

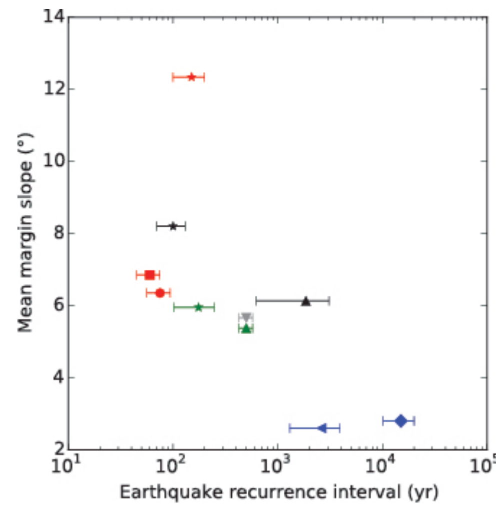
Tsunami from Cuba?



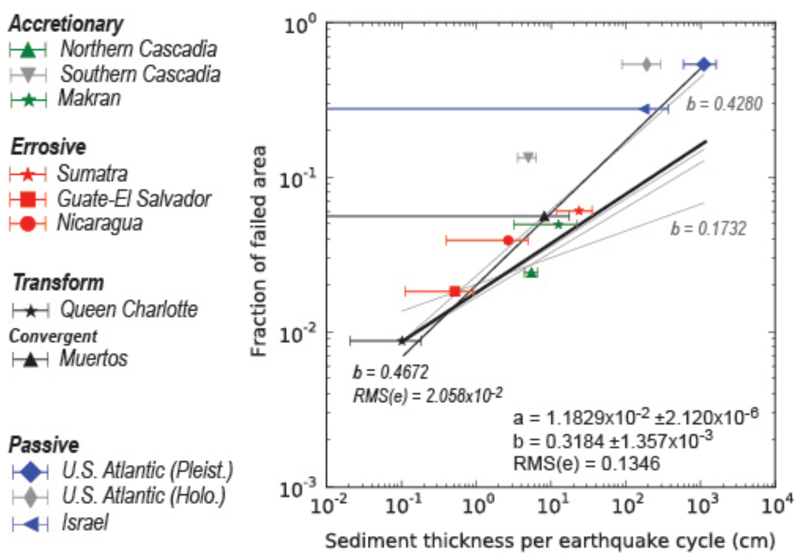
Spatial probability of landslide distribution



Frequent earthquake shaking leads to reduction in the abundance of submarine slope failures likely by increasing sediment shear strength from densification.



Margin gradient indeed increases with more frequent earthquakes



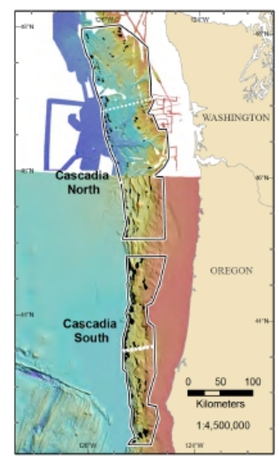
***F* = 0.018 * *SEQ*^0.32**

($0.17 < b < 0.43$)

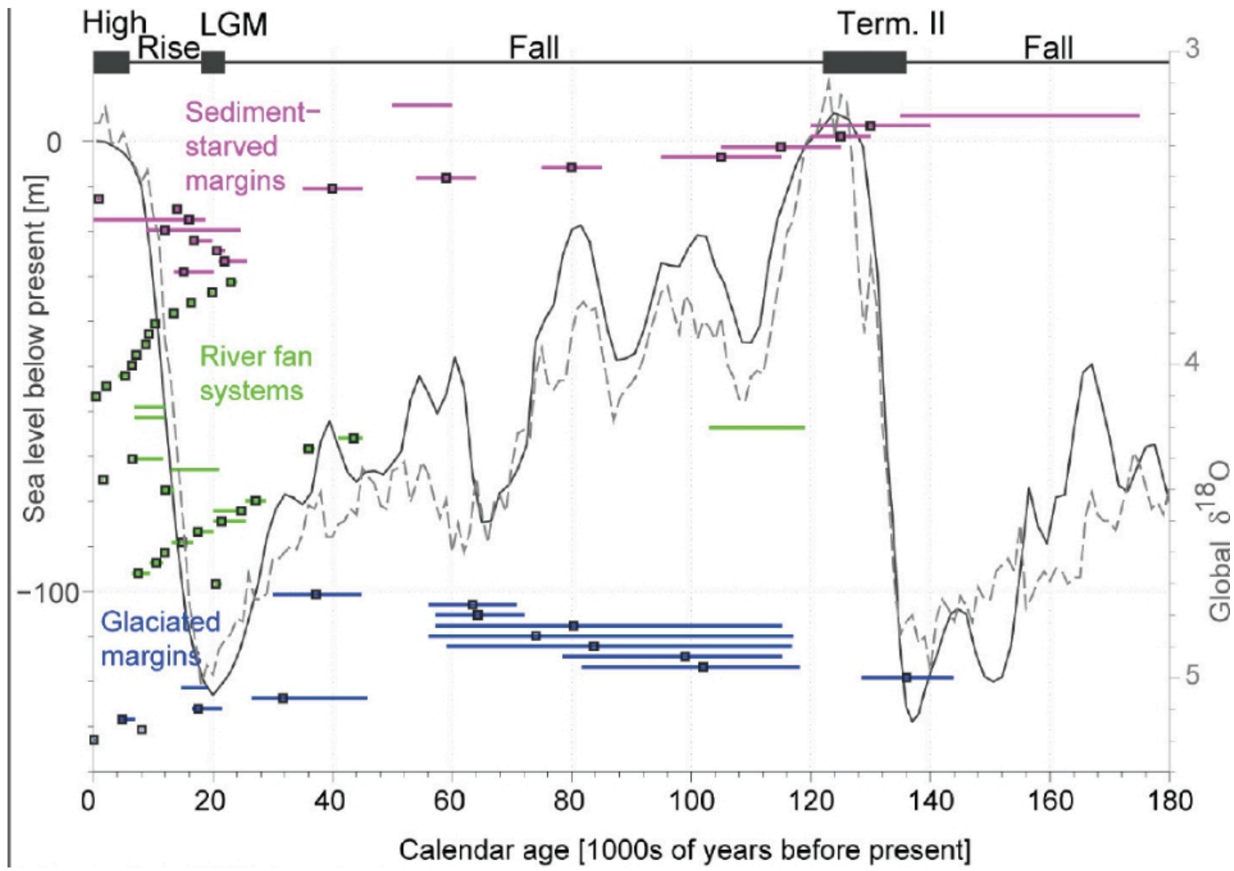
F – Fraction of failed area

SEQ – Sediment (in cm) that accumulates during an inter-seismic interval

Southern Cascadia is an outlier



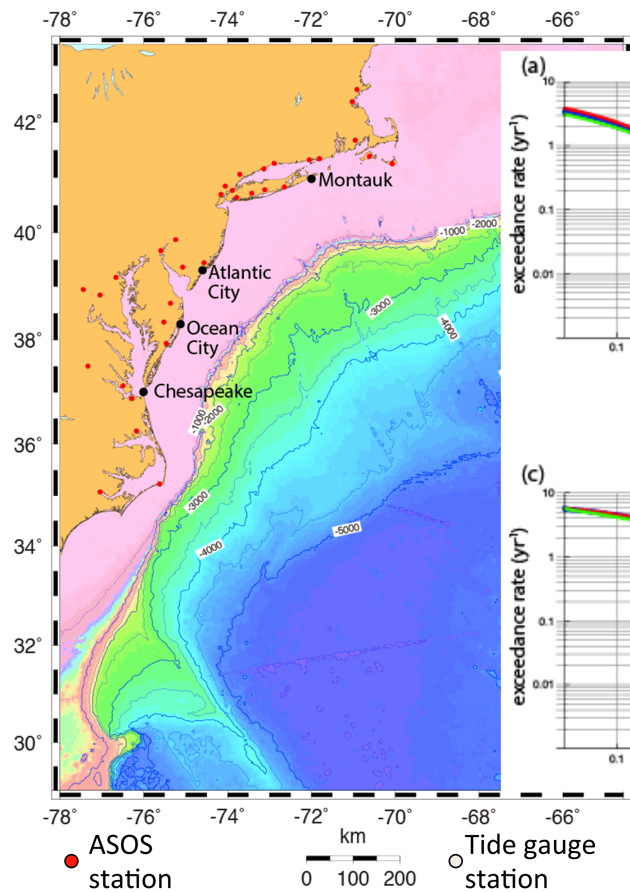
Temporal probability of landslide distribution

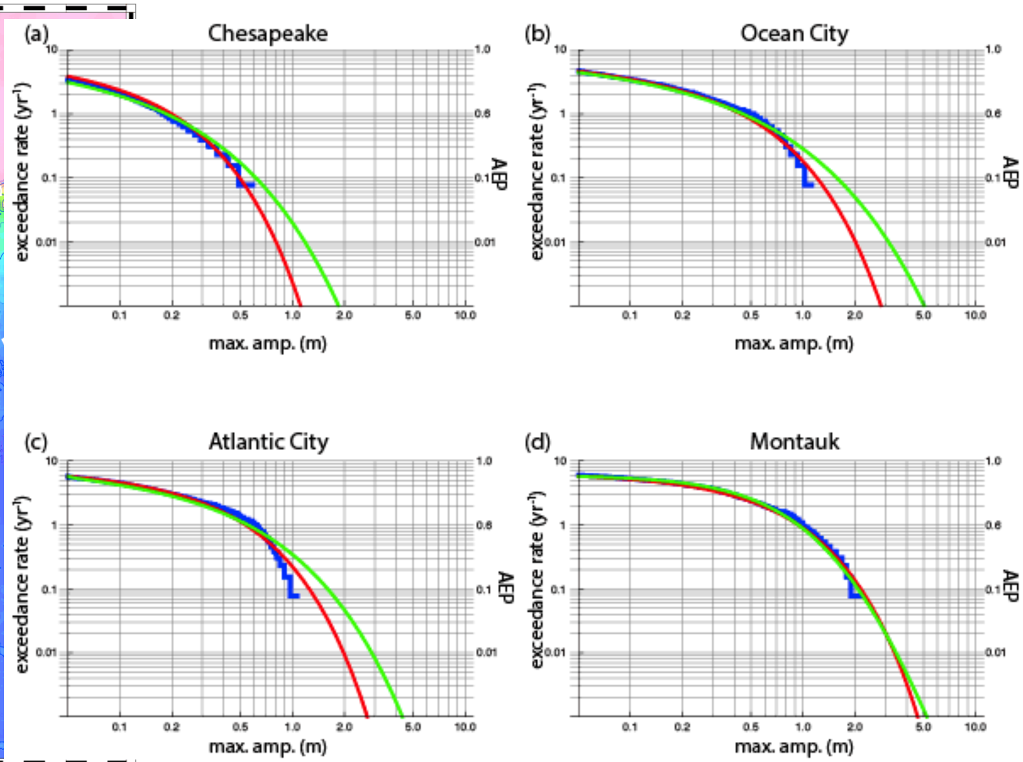


Uniform? Doesn't appear to be in the Atlantic margin

(Urlaub et al., 2013)

Meteo-tsunami probability: Squall Sources Northeast U.S.





Pressure difference, Front Length, Speed estimates and Period of pressure disturbance are from From Automated Surface Observing System (ASOS) station data

Extrapolated hazard curves using tapered Pareto (red) and GDP model (green) probability models. Blue – Mean hazard curves from Monte Carlo simulations.

(Geist et al., 2014)

Tsunami hazard assessment projects for the Atlantic, Caribbean and the Gulf of Mexico (2006-2016)

- Marine geohazards sources and probabilities (USGS funded, 2013 -)
- Earthquake and tsunami hazard potential in the Caribbean (USGS funded, 2006-2013)
- Tsunami Landslide Source Probability and Potential Impact on New and Existing Power Plants (U.S.-NRC funded, 2009-2016)
- Physical study of tsunami sources (U.S. NRC funded, 2007-2008)
- Regional assessment of tsunami potential in the Gulf of Mexico (NTHMP funded, 2009)

Reports written to the funding agencies

- The current State of Knowledge regarding potential tsunami sources affecting the U.S. Atlantic and Gulf of Mexico Coasts (375 pp., 2007),
  Evaluation of Tsunami Sources with the Potential to Impact the U.S Atlantic and Gulf Coasts (375 pp., 2008)
- NRC/USGS Workshop Report: Landslide Tsunami Probability (43 pp., 530 pp. appendix 2012).
- Tsunami Hazard Assessment for the U.S. Atlantic and Gulf Coasts (375 pp., in review)
- Report to NTHMP: Regional assessment of tsunami potential in the Gulf of Mexico (90 pp., 2009)

Key players in these projects

USGS Woods Hole: Uri ten Brink, Jason Chaytor, Brian Andrews, David Twichell, Claudia Flores,

USGS Menlo Park: Eric Geist, Homa Lee (Ret.), Bill Bakun (Ret.), Tom Parsons

USGS Santa Cruz: Bruce Jaffe, Bruce Richmond, Steve Watt, Mark Buckley, Danny Brothers

USGS Seattle: Brian Atwater

NOAA PMEL: Yong Wei

Academia: Pat Lynett, Jacques Locat, Roy Barkan, Alberto Lopez-Venegas, Jose-Luis Granja,

Hallie Meighan, Jay Pulliam, Jian Lin

Around 50 peer-reviewed papers and maps were published as part of this effort